Robert P. Do

Electronic Data Interchange and Naval Aviation

ABSTRACT With the Department of Defense (DoD) community facing declining budgets, reductions in workforce, and a shrinking business base, re-thinking of traditional methods of doing business is necessary As part of the larger Federal government initiative, DoD has adopted Electronic Data Interchange (EDI) to improve its mission effectiveness and reduce operating costs. EDI is the paperless exchange of business information using standard, transaction-based formats. The EDI standard details how to format electronic messages that transmit information usually found on purchase orders, invoices, and other documents. The benefits of EDI to Naval Air Systems (NAVAIR) are more than just reducing paperwork, eliminating data entry errors, and receiving more timely data. EDI is a methodology to streamline functional processes; increase visibility of requirements to commercial activities: increase productivity through reduced cycle times; reduce material inventories, and develop electronic linkage from Navy information systems to DoD trading partners. This paper examines the technology of EDI, its uses, benefits, and explores some of the opportunities for EDI applications in the NAVAIR community such as: maintenance and engineering: procurement: and financial management.

Introduction

With the Department of Defense (DoD) community facing declining budgets, reductions in workforce, and a shrinking business base, are-thinking of traditional methods of doing business is a necessity. As part of the larger Federal government initiative, DoD has adopted Electronic Data Interchange (EDI) to improve its mission effectiveness and reduce operating costs. The Department of the Navy has embraced EDI as one of several technologies to improve quality and reduce the cost of its operations.

What is EC/EDI?

Electronic Commerce (EC) is the integration of electronic mail, electronic funds transfer, EDI, and other similar technologies into a comprehensive electronic-based system compassing all DoD business processes. DoD's thrust is not just to automate manual processes, but to put in place the necessary systems, capabilities, and procedures that will enable DoD activities to fundamentally alter and improve their business practices.

EDI is the computer application-to-computer application exchange of business data in a standard format between trading partners. A trading partner is a customer, supplier, or service provider that conducts business with a DoD activity (i.e. commercial vendor or government activity). EDI transactions cover traditional processes such as purchase orders, bills of lading, invoices, payments, acknowledgments, pricing, and financial reporting. Several data exchange techniques are frequently mislabeled as EDI. Facsimile (fax) transmission of a paper document from one fax machine to another is not EDI. It requires someone to interpret the written data and rekey it into an application system. Both of these functions, in addition to taking time, introduce errors into the processing of the data. Electronic mail (e-mail) eliminates the paper associated with the fax, but it still is not EDI. E-mail moves the information directly from one computer to another, but still requires someone to interpret the data and then rekey specific data elements into an application system for additional processing.

The use of dedicated computer terminals to link two or more activities also is not EDI because data is not being transmitted in a standard format. Someone is still required to manually key data for transmission subject to associated errors and time

Robert P. Dolan *graduated from Iowa State University in 1976 with a B.S. in Industrial Management and received his MBA from Marymount University in 1986. Mr. Dolan has been employed at the Naval Air Systems Command for the last sewn years where he has lead several aviation information system initiatives. Currently he serves as the NAVAIR Electronic Commerce/Electronic Data Interchange manager within the Continuous Acquisition and Life C@ Support section. Mr. DoIan previously worked for four years as the project manager for the Aviation 3M system and functional manager for the Naval Aviation Logistics Command Management Information System. He also spent ten years as a Naval officer at various shipboard and field activities.*

delays. Also, in many cases, someone at the receiving activity must rekey that same data into a format accepted by their internal system. Exchanging data electronically with a single trading partner using non-standard data formats is a proprietary form of EDI. Proprietary ED1 yields some of the benefits of EDI and may satisfy a one-on-one trading partner relationship, but it cannot be readily extended to additional trading partners. As a result proprietary EDI has limited application.

EDI Technology

EDI is both a standard and a technology. The American National Standards institute (ANSI) Accredited Standards Committee (ASC) X12 approves the formats of EDI messages used by U.S. industries today. EDI transaction standards describe how to format electronic versions of paper proposals, purchase orders, invoices, and other business forms. The formats themselves are organized hierarchically into data elements, data segments (groups of data elements) and transaction sets (groups of data segments). To support the ASC X12 message format, EDI requires computer hardware, software, and telecommunications. Trading partner computers receive, process, and transmit the standard transactions. Telecommunications networks connect these computers, replacing the mail system and couriers as the exchange media.

Figure 1 graphically depicts a typical EDI transaction, outbound and inbound, between trading partners. The first step in any outbound EDI transaction is the extraction of the data from the senders application program into a user-defined file (UDF). An EDI document can be generated using the data in the application program databases. However, since the structure and syntax of application program databases vary. EDI is difficult to generate directly from these sources. The data must first be extracted from the database and converted to a usable form. The data is extracted from the database, flat file formatter program, and restructured into a flat data file or UDF. The second step is transmitting the UDF to a EDI translator, situated locally or geographically separated from the organization. The EDI translator maps the data from the UDF format to the appropriate X12 transaction set data structure necessary to meet the standards requirements.

Once in the X12 format, the standard transaction set is transmitted to the trading partner directly or through the use of a Value Added Network (VAN). A VAN provides a communication network to connect trading partners together, regardless of

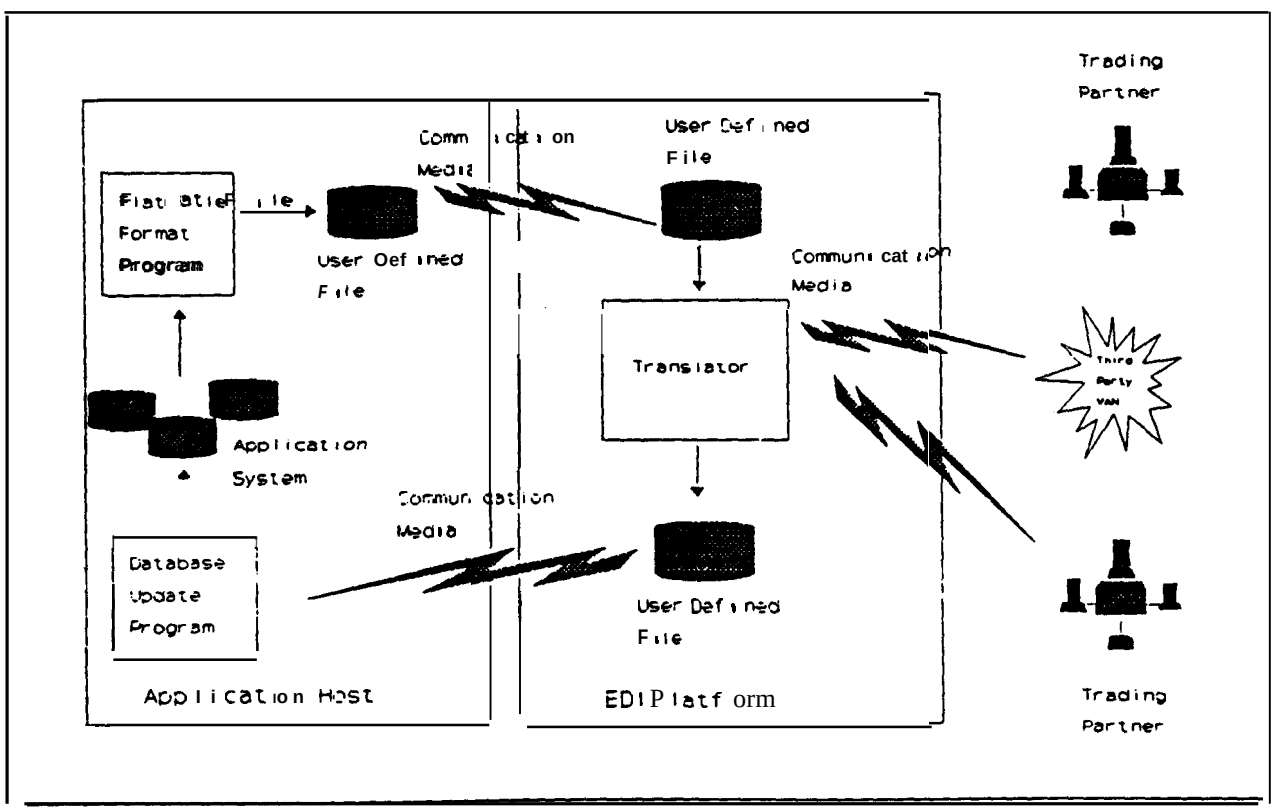

FIGURE 1. EDI Transaction Flow

the diverse communication types and protocols of each partner. Each user establishes a single, consistent interface with the VAN and the VAN manages the connections to all trading partners. The VAN offers a mailbox service that allows transactions to be collected until the receiver is ready to collect them. The VAN is also a neutraf intermediary that provides a security barrier against multiple partners accessing your computer system. For inbound EDI a similar, but reverse process occurs. Your trading partner sends an X12 formatted transaction, which is read by the EDI translator and mapped into a UDF. The UDF is transmitted to the receivers application update program and mapped into a data format recognizable by your application program, and updates the database files with the incoming information.

EDI is not a complicated or leading edge technology. It allows the users to electronically transmit data from one trading partner to another regardless of each others unique data formats within their software application programs. The power of EDI is that it facilitates business issues of speed, cycle time reduction, and seamless interchange of data and information to trading partners.

EDI Benefits

The use of EDI, as shown in Figure 2, eliminates many of the problems found in the traditional flow. First, the time delays associated with mailing (or other forms of physical transmission) are eliminated. The processing time required to read, interpret, and enter data is also eliminated. Second, since the same data is not repeatedly keyed, the chance for data errors is significantly reduced. Third, because the data is not manually entered at each step of the process, processing time can be minimized. Tasks such as data entry, filing, storing, and reconciliation are significantly reduced. Fourth, because time delays are reduced and lost documents are eliminated, there is more certainty in information flow EDI also allows for a more timely receipt of necessary data for decision-making. Besides reducing errors and time, implementing an

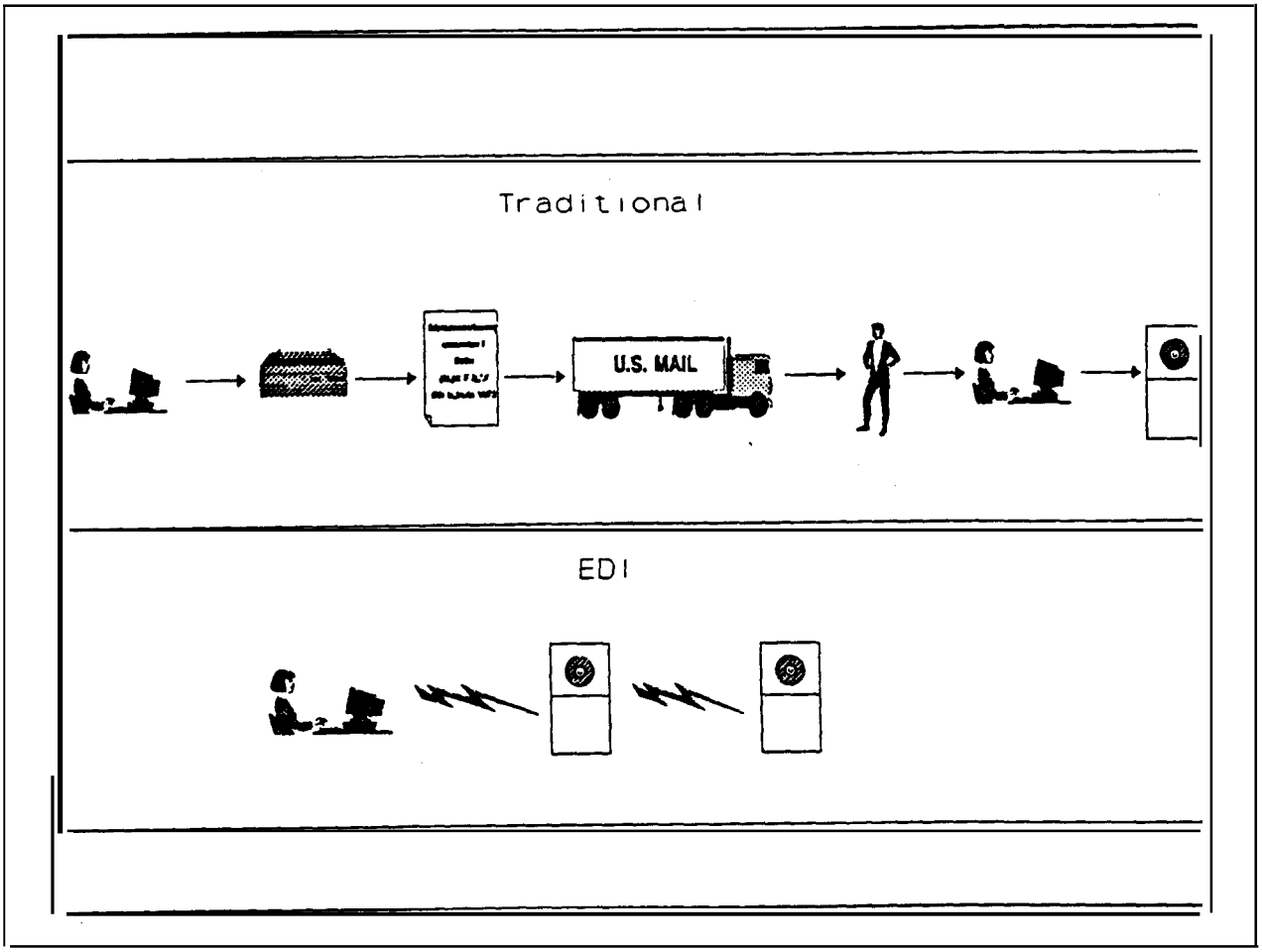

FIGURE 2. EDI vs. Traditional Methods

EDI effort within an organization provides a chance to improve internal business processes as well.

implementing EDI successfully requires a review of current processes. Before it is possible to replace paper flows with electronic flows, the paper flow must be understood. The complete review and evaluation of the current process often forces an organization to take a hard look at how they are doing business for the first time. This assessment may bring to light procedures that add no value to the process, ways to streamline processes (i.e. concurrent rather than a sequential process), and integration of information systems and technologies. NAWC WD China Lake, in evaluating their small purchase procurement process, used EDI and bar code technology to tie together procurement, supply and finance functions that reduced their procurement lead time from 95 to 5 days. The benefit of EDI to an organization is more than just a technology to reduce paperwork, eliminate data entry errors, and to receive more timely data. EDI is a methodology to streamline functional processes of an organization.

DoD EDI Program Focus

The functional area that has received the prime focus for EDI in DoD is procurement. The Deputy Under Secretary of Defense for Acquisition Reform put forth a vision on the use of EDI transactions in all facets of the procurement cycle. At the present time, EDI procurement projects have been geared to streamlining small business acquisitions, which are all purchases of less than $25,000. This is a significant burden on a small business trying to keep track of as many as 50,000 requests for quotations (RFQs) *per* day. To ease this workload, DoD's three main projects are geared towards providing a single point for government procurement requirements. The Navy's Electronic Assisted Solicitation Exchange (EASE) is a PC-based interaction exchange network that posts small purchase RFQs created by EDI-capable procurement systems, so that vendors can view and respond to them. EASE extracts data from the RFQs and sends tailored files to the CompuServe telecommunications network. EASE is currently placing orders directly with larger existing contractors to bring its total volume of orders to $100 million. The Air Force's Government Acquisition Through Electronic Commerce (GATEC) sends RFQs to vendors, receives quotes from vendors, and transmit awards and award information back to vendors. The third main DoD EDI project is the Army's Standard Army Automated Contracting System (SAACON), which is currently transmitting more than 2,000 RFQ's and 1,000 purchase orders per month. Currently SAACON is using a single Value Added Network (VAN) to post its procurements, but has a goal of using a multi-VAN approach. The ultimate goal of DoD is to provide a single face to industry with all vendors dealing with all services through a single central V'.

Naval Aviation EDI Applications and Opportunities

While not faced with the same focus on profit that private industry has, DoD is faced with strong pressure to reduce costs while not reducing capability As NAVAIR realigns its organization to reflect a smaller and more integrated workforce, ways of doing business more efficiently must be found to provide the quality support expected from NAVAIR customers. EDI is a necessary tool to streamline the NAVAIR business processes and increase productivity.

Uses for EDI exist in all functional areas within NAVAIR. Any information that is on a form of any kind is a potential candidate for EDI. Some of the applications for EDIs that I envision within the NAVAIR team include the following.

PROCUREMENT

Procurement and contract administration has received the most attention within DoD for EDI implementation. The EDI transaction sets that have been developed for the procurement area are applicable for the processes at the field contracting offices and NAVAIR headquarters. The Small Procurement EDI (SPEDI) system at NAWC WD China Lake was developed to take advantage of EC technology to improve their procurement process. SPEDI is an electronic catalog of small purchase items, Indefinite Delivery Indefinite Quantity contract line items, that links the internal customer with the vendor. Using EDI and bar code technology to tie together procurement, supply and finance functions has reduced the procurement lead time from 95 to 5 days (Figure 3). Another EC/EDI acquisition initiative in NAVAIR is the Joint Acquisition Management System (JAMS) currently being prototype at NAWC Orlando. JAMS is an integrated program management and acquisition document system. It allows for the development of procurement documentation (i.e. source selection plan, acquisition plan, Statement of Work, Request for Proposal [RFP], etc.] and the posting of the RFP on an electronic bulletin board using EDI transactions.

FINANCIAL MANAGEMENT

Most of the EDI activity in this functional area has been with the electronic submission of invoices and electronic payment to vendors. Currently AIR-524, Cost Analysis Division, is prototyping a new EDI transaction standard to accept contractor cost data electronically transmitted from the vendor. This will replace the paper Contractor Cost Data Reporting form, DD Form 1921 series now used to report the actual costs that a contractor incurs. Opportunities exist for NAVAIR in the transmission of funding documents to field activities and submission accounting data to the Standard Accounting and Reporting

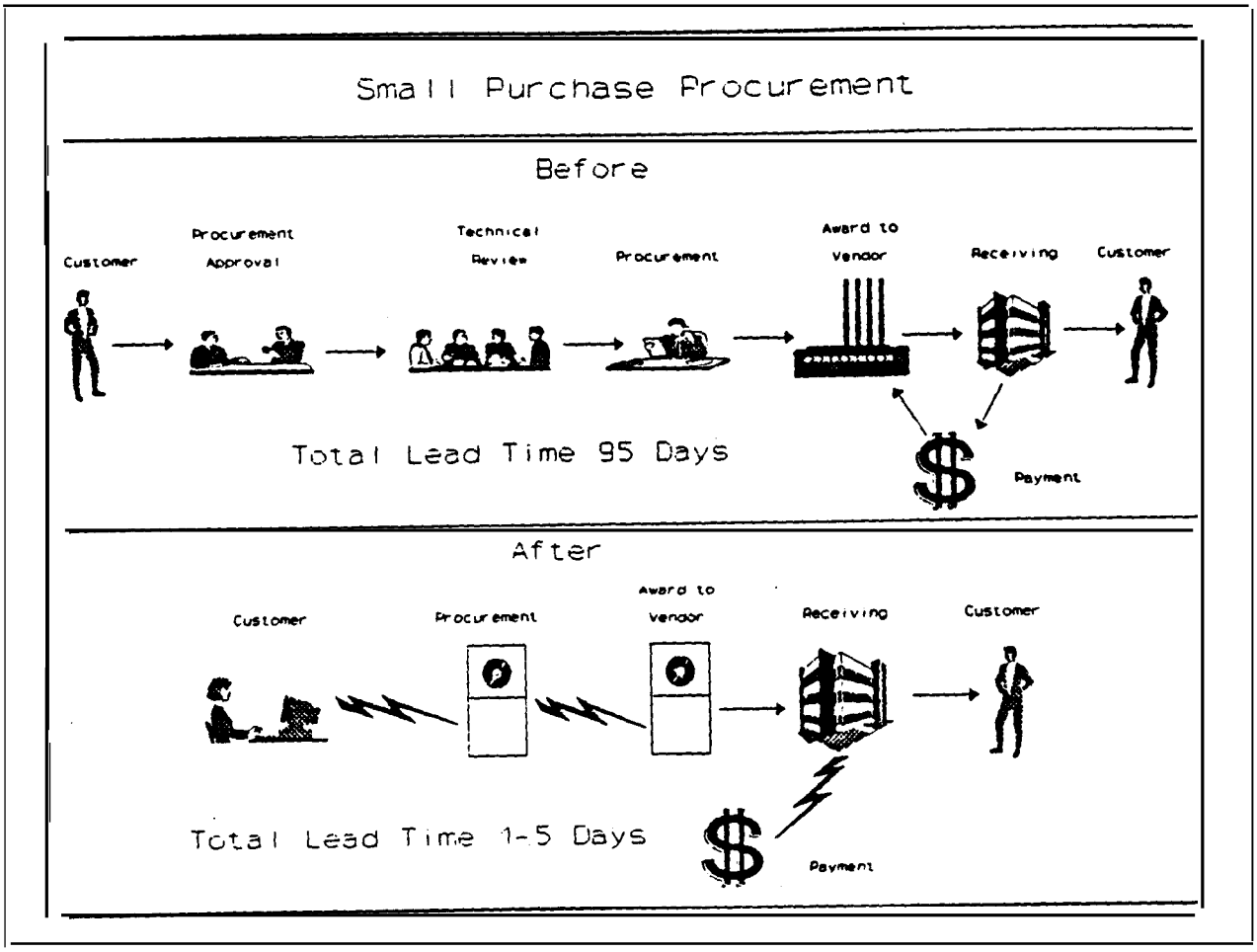

FIGURE 3. SPEDI Procurement Process

System (STARS) and the Mechanization of Contract Administration Services (MOCAS) system. Presently these manual processes cause large productivity losses due to a lengthy processing cycle, lost documents, and data entry errors.

MAINTENANCE/ENGINEERING

This functional area focuses on the processes that support maintenance overhauls. system upgrades. repairs, and the replacement of equipment and parts. The opportunities in this area are in the transmission of technical information to and from maintenance (afloat and ashore) activities: cognizant field activities (CFA); Inventory Control Points (ICP); NAVAIR headquarters and major suppliers. Specific projects could include the submission of non-standard material requisitioning and non-standard item demand data from maintenance activities to the ICP; transmission of Engineering Change Proposal information to NAVAIR headquarters or the CFA; an electronic methodology to support the movement of Technical Directives and Bulletins between the CFA, NAVAIR headquarters. and the fleet; and the transmission of Technical Publication Discrepancy Reports from the fleet to the CFA and/or the Naval Air Technical Services Facility.

As functional area managers review their specific processes and the manual forms being utilized many more potential EDI projects will be identified.

SUMMARY

As DoD progresses in their efforts to make EDI the normal way of doing business, NAVAIR as a corporation needs to be on the fore-front of integrating EDI at all levels of operation. The successes of private industry and the initial DoD efforts have shown that EDI is a tool that can offer NAVAIR significant improvements in the efficiency and effectiveness of our daily business processes. To make EDI a reality within NAVAIR the following steps are being taken to ensure a smooth implementation process:

1. Obtain Top Management Support.

The backing from higher management is a must. Support from the top is important for any major organizational or process change. EDI is a tool that changes current processes within and between an organization's functional departments.

2. Establish Functional Area EDI Coordinators.

Along with top management support equally critical to the success of EDI is a wide base of support within the organization. Because the implementation of EDI affects so many functional areas, an EDI team with members from across the organization is necessary

3. Conduct EDI Training.

Education of the core EDI team members is essential to the success of an EDI implementation effort. Team members need a thorough understanding of what EDI is and how it works.

4. Identify Potential EDI Projects.

EDI team members will review and identify processes in their functional area that would benefit from EDI. The best opportunities for implementing effective EDI are those processes that have high volume transactions with consistent data sets.

5. Develop EDI Project Plan.

As individual EDI projects are identified, project plans will be developed. These plans must be able to define, measure, and document the current process and the improved EDI process. This should include all of the involved trading partners and applicable information systems within the process. Additionally the EDI project plan must be able to identify appropriate performance goals and associated metrics to establish an effective measurement mechanism.

6. Conduct Prototype.

Once the EDI project has been accepted, a small scale prototype of the EDI process will be implemented. This prototype EDI project will be designed, developed and tested before full implementation can occur within any given functional process.

7. Review Prototype Test Results.

After the prototype test is completed, a review of the entire EDI effort should be conducted before expand@ the usage. Lessons learned in implementing the prototype and any problems that occurred during testing will be fully documented.

8. Expand Usage.

When all of the documented problems that resulted from the prototype test have been resolved, the EDI system will be expanded to all trading partners.

9. Publicize Efforts.

A final step that is very important to a successful EDI effort is to publicize EDI activities. It is advisable to communicate important achievements and goal attainments within NAVAIR and to outside organizations. Emphasizing benefits and progress will encourage growth and expansion of EDI within the NAVAIR team.

The benefit of EDI to an organization is more than just a technology to reduce paperwork. eliminate data entry errors, and to receive more timely data. EDI is a methodology to streamline functional processes: increase visibility of requirements to commercial activities; increase productivity due to reduced cycle times; reduce material inventones and develop electronic linkage from Navy information system to DoD trading partner systems. +

REFERENCES

[1] Emmelhainz, M.A. "EDI A Tota Management Guide." Van Nostran Reinhold, 1993.

[2] Hardcastle, T.P. "'EDI Planning and Implementation Guide." Logistic Management Institute, 1993.

[3] Gordon, G.M. "EDI in Departmen of Defense Procurement." ED World, 1993 September.

[4] Deputy Under Secretary of Defens (Acquisition Reform) "E tronic Commerce (EC)/Electroni Data Interchange (EDI) in Contract ing Report." Us. Government Print ing Office, 1993.

[5] Naval Supply Systems Command "'Strategic Plan for Electronic Dat Interchange." Defense Printing Ser vice, 1993.